

**DR. DOMINIC MAKAA KITAVI**  
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## **OBJECTIVES**

- To be a distinguished researcher in Mathematics, Statistics, and Engineering.
- To share my knowledge/expertise with colleagues and students.

## **EDUCATION**

Ph.D. in Applied Mathematics, Sep. 2017

- The Hong Kong Polytechnic University, Hong Kong.
- **Dissertation:** Analytical derivation of lower bounds of the estimation error of statistically unbiased estimation of electromagnetic/acoustic wireless signal parameters.  
<http://hdl.handle.net/10397/70368>

M.Sc. in Mathematical Sciences, Distinction, Jun. 2013

- University of the Western Cape, South Africa.
- African Institute for Mathematical Sciences – South Africa.
- **Thesis:** Numerical solution of the Korteweg-de Vries equation.  
<http://archive.aims.ac.za/structured-masters-research-projects/2012-13>

B.Sc. in Mathematics, First-Class Honours, Sep. 2011

- The University of Nairobi, Kenya.

Kenya Certificate of Secondary Education (KCSE), A – (minus), 2005

- Endau Secondary School, Kitui.

Kenya Certificate of Primary Education (KCPE), 375/500, 2001

- Imuatine Primary School, Kitui.

## **WORK EXPERIENCE**

**Jan. 2022 – Present:** Senior Lecturer, University of Embu, Kenya

- Department of Mathematics and Statistics.

**Sep. 2017 – Dec. 2021:** Lecturer, University of Embu, Kenya

- Department of Mathematics, Computing, and Information Technology.

**Jan. 2014 – Aug. 2014:** Assistant Lecturer, Mount Kenya University, Kenya

- Department of Mathematics, Statistics, and Actuarial Science.

## **ADMINISTRATIVE RESPONSIBILITIES**

**Jul. 2021 – Present:** Chairman, Department of Mathematics and Statistics, University of Embu.

**Jan. 2021 – Jul. 2021:** Departmental Examinations Coordinator, University of Embu

- Department of Mathematics, Computing, and Information Technology.

## **OTHER RESPONSIBILITIES**

**Jun. 2021 – Present:** Coordinator, KAPEK Kenya Mathematical Olympiad, University of Nairobi.

**Nov. 2020 – Present:** Chairman, Research Dissemination Workshop Planning Committee, School of Pure and Applied Sciences, University of Embu.

**Aug. 2020 – Present:** Member, Diploma and Certificate Programmes Advisory Committee,  
University of Embu.

**May 2019 – Present:** Member, Board of Management, Endau Secondary School, Kitui County.

**May 2018 – Present:** Member, Board of Postgraduate Studies Committee

- School of Pure and Applied Sciences, University of Embu.

### ONGOING SUPERVISION OF POSTGRADUATE STUDENTS

1. **Kevin Ng'ang'a (B531/1333/2019)** – *Master of Science in Statistics*  
**Thesis Title:** Forecasting Stock Prices in Nairobi Stock Exchange  
**Institution:** University of Embu

### SUPERVISED POSTGRADUATE STUDENTS TO COMPLETION

1. **Maurice Wanyonyi (B531/1313/2019)** - *Master of Science in Statistics*.  
Thesis title: Modelling COVID-19 Pandemic in Kenya.  
Graduation: September 2021, **University of Embu**.
2. **Veronica Nyokabi (B527/1104/2016)** - *Master of Science in Applied Mathematics*.  
Thesis title: Cramer-Rao bound of Direction Finding Using Uniform Arc Arrays  
Graduation: September 2019, **University of Embu**.
3. **Musyoka Kinyili (B527/1145/2017)** - *Master of Science in Applied Mathematics*.  
Thesis title: Cramer-Rao bound of Direction Finding Using 2-Circle Concentric Uniform Array  
Graduation: September 2019, **University of Embu**.
4. **Grace Ndiritu (B527/1141/2017)** - *Master of Science in Applied Mathematics*  
Thesis title: Cramer-Rao bound of Direction Finding Using Uniform Hexagonal Array  
Graduation: September 2019, **University of Embu**.

### CURRICULUM DEVELOPMENT

1. **Bachelor of Science in Mathematics with Computing**  
**Status:** New Academic programme completed in November 2019  
**Institution:** University of Embu, Kenya  
**First Intake:** September 2020

### PUBLICATIONS

#### *JOURNAL PAPERS*

1. M. Wanyonyi, **D. M. Kitavi**, D. M. Mugo, & E. B. Atitwa, "COVID-19 Prediction in Kenya Using the ARIMA Model," *International Journal of Electrical Engineering and Technology*, vol. 12, no. 8, pp. 105 – 114, August 2021.  
[https://iaeme.com/Home/article\\_id/IJEET\\_12\\_08\\_009](https://iaeme.com/Home/article_id/IJEET_12_08_009)
2. C. G. Ngari, **D. M. Kitavi**, P. M. Ngari, & D. M. Mugo, "Parameters and State Estimates of Sex Based COVID-19 Model Using Kenya Data, Nonlinear Least Square and Interpolating Polynomials," *International Journal of Scientific and Research Publications*, vol. 11, no. 5, pp. 393 – 408, May 2021, <http://www.ijrpb.org/research-paper-0521.php?rp=P11311277>
3. C. G. Ngari & **D. M. Kitavi**, "Parameterization and Forecasting of Childhood Pneumonia Model Using Least Square Approximation, Lagrange Polynomial and Monte Carlo Simulation," *Journal of the Annual Research and Review in Biology*, vol. 35, no. 8, pp. 102 – 114, August 2020. <https://www.journalarrb.com/index.php/ARRB/article/view/30265>
4. **D. M. Kitavi**, K. T. Wong, T.-C. Lin, & Y. I. Wu, "Hybrid Cramer-Rao Bound of Direction Finding Using a Triad of Cardioid Sensors That are Perpendicularly Oriented and Spatially Collocated," *Journal of Acoustical Society of America*, vol. 146, no. 2, pp. 1099 – 1109, August 2019. <https://asa.scitation.org/doi/10.1121/1.5120521>
5. K. T. Wong, Z. N. Morris, **D. M. Kitavi**, & T.-C. Lin, "A Uniform Circular Array of Isotropic Sensors that Stochastically Dislocate in Three Dimensions – The Hybrid Cramer-Rao Bound of Direction-of-Arrival Estimation," *Journal of Acoustical Society of America*, vol. 146, no. 1, pp. 150 – 163, July 2019. <https://asa.scitation.org/doi/10.1121/1.5098771>
6. V. Nyokabi, **D. M. Kitavi**, & C. G. Ngari, "Cramer-Rao Bound of Direction Finding Using Uniform Arc Arrays," *Journal of Advances in Mathematics a-nd Computer Science*, vol. 33, no. 1, pp. 1 – 15, July 2019.

<http://www.journaljamcs.com/index.php/JAMCS/article/view/30168>

7. G. W. Ndiritu, **D. M. Kitavi**, & C. G. Ngari, “Cramer-Rao Bound of Direction Finding Using a Uniform Hexagonal Array,” *Journal of Advances in Mathematics and Computer Science*, vol. 32, no. 6, pp. 1 – 14, June 2019.  
<http://www.journaljamcs.com/index.php/JAMCS/article/view/30161>
8. M. Kinyili, **D. M. Kitavi**, & C. G. Ngari, “Aperture Maximization with Half-Wavelength Spacing, via a 2-Circle Concentric Array Geometry that is Uniform but Sparse,” *Journal of Advances in Mathematics and Computer Science*, vol. 32, no. 3, pp. 1 – 20, May 2019.  
<http://www.journaljamcs.com/index.php/JAMCS/article/view/30148>
9. **D. M. Kitavi**, K. T. Wong & C.-C. S. Hung, “An L-shaped Array with Non-Orthogonal Axes – Its Cramer-Rao Bound for Direction Finding,” *IEEE Transactions on Aerospace and Electronic Systems*, vol. 54, no. 1, pp. 486 – 492, February 2018.  
<http://ieeexplore.ieee.org/document/8012415/>
10. **D. M. Kitavi**, K. T. Wong, M. Zou & K. Agrawal, “A Lower Bound of Estimation Error of an Emitter's Direction-of-Arrival / Polarization, for a Collocated Triad of Orthogonal Dipoles/Loops That Fail Randomly,” *IET Microwaves, Antennas & Propagation*, vol. 11, no. 7, pp. 961 – 970, June 2017. <http://ieeexplore.ieee.org/document/7935594/>
11. **D. M. Kitavi**, T.-C. Lin, K. T. Wong & Y. I. Wu, “Direction Finding with the Sensors' Gains Suffering Bayesian Uncertainty — Hybrid CRB and MAP Estimation,” *IEEE Transactions on Aerospace and Electronic Systems*, vol. 52, no. 4, pp. 2038 – 2044, August 2016.  
<http://ieeexplore.ieee.org/abstract/document/7738373/>

#### CONFERENCE PAPERS/PRESENTATIONS

1. **D. M. Kitavi** & F. M. Musyoka, “Cramer-Rao Bound for Direction-of-Arrival Estimation Using a Triad of First-Order Cardioid Sensors,” *Proceedings of the International Conference on Electrical, Computer and Energy Technologies (ICECET)*, 9-10 December 2021, Cape Town, South Africa.
2. **D. M. Kitavi** & K. T. Wong, “A Uniform Rectangular Array of Isotropic Sensors of Stochastic Gains: The Hybrid Cramer-Rao Bound for Direction Finding,” *Journal of the Acoustical Society of America*, vol. 146, no. 4, pp. 2867, November 2019.  
<https://asa.scitation.org/doi/abs/10.1121/1.5136948>
3. M. Kinyili & **D. M. Kitavi**, “Precision of 3-Configurations with Respective Sub-Configurations of 2-Ring Concentric Planar Array in Direction finding,” *Kirinyaga University 3<sup>rd</sup> Annual International Conference*, September 2019.  
[https://www.kyu.ac.ke/phocadownload/Book\\_of\\_Abstracts/BOOK%20OF%20ABSTRACTS.%202019.pdf](https://www.kyu.ac.ke/phocadownload/Book_of_Abstracts/BOOK%20OF%20ABSTRACTS.%202019.pdf)
4. **D. M. Kitavi** & M. Kinyili, “Cramer-Rao Bound of Direction Finding Using Multi-Concentric Circular Arrays,” *Proceedings of the 6<sup>th</sup> International Arab Conference on Mathematics and Computations (IACMC)*, pp. 49-55, April 2019, <http://iacmc.zu.edu.jo/eng/>
5. Z. N. Morris, K. T. Wong, **D. M. Kitavi**, & T.-C. Lin, “The Hybrid Cramer-Rao Bound of Direction Finding by a Uniform Circular Array of Isotropic Sensors that Suffer Stochastic Dislocations,” *Journal of the Acoustical Society of America (ASA)*, vol. 142, no. 4, pp. 2554, November 2017. <http://asa.scitation.org/doi/10.1121/1.5014336>
6. **D. M. Kitavi**, K. T. Wong, L. Yeh & T.-C. Lin, “Cramer-Rao Bound for Direction Finding at a Tri-Axial Velocity-Sensor of an Acoustic Event Having an AR(1) Temporal Auto-Correlation,” *Journal of the Acoustical Society of America (ASA)*, vol. 141, no.5, pp. 3650, June 2017. <http://asa.scitation.org/doi/abs/10.1121/1.4987895>
7. **D. M. Kitavi**, H. Tan & K. T. Wong, “A Regular Tetrahedral Array Whose Constituent Sensors Fail Randomly - A Lower Bound for Direction-of-Arrival Estimation,” *2016 IEEE Loughborough Antennas & Propagation Conference (LAPC)*, pp. 1 – 5, November 2016.  
<http://ieeexplore.ieee.org/document/7807600/>

8. **D. M. Kitavi**, T.-C. Lin & K. T. Wong, “A Tetrahedral Array of Isotropic Sensors, Each Suffering a Random Complex Gain – The Resulting Hybrid Cramer-Rao Bound for Direction Finding,” *2016 IEEE National Aerospace and Electronics Conference (NAECON) and Ohio Innovation Summit (OIS)*, pp. 412 – 415, July 2016.  
<http://ieeexplore.ieee.org/document/7856840/>

#### **DEVELOPED LEARNING MODULES (NON-REVIEWED)**

1. SMA 232: Introduction to Numerical Methods – June 2020.
2. CSC 113: Discrete Mathematics – July 2020.
3. CSC 114: Differential and Integral Calculus – August 2020.
4. SMA 201: Advanced Calculus – August 2020.
5. ACS 103 / AEB 107: Mathematics – September 2020.
6. SMA 211: Applied Calculus – July 2021

#### **REVIEWER FOR SELECTED PROFESSIONAL JOURNALS**

1. IEEE Transactions on Aerospace and Electronic Systems
2. Journal of Acoustical Society of America
3. Scientific African Journal – Elsevier

#### **SCHOLARSHIPS / AWARDS**

Hong Kong PhD Fellowship Scheme, Sep. 2014 – Aug. 2017

- Awarded by the Research Grants Council of Hong Kong.

ABSA Bursary Award, 2013

- Awarded by ABSA Group Limited, South Africa.

AIMS Master Degree Scholarship, 2012

- Awarded by the African Institute for Mathematical Sciences - South Africa.

#### **REFEREES**

1. Dr. James Katende, Senior Lecturer, University of Nairobi  
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2. Dr. David Mugo, Senior Lecturer and Head of Computing and Information Technology Department, University of Embu, Contacts: [david.mugo@embuni.ac.ke](mailto:david.mugo@embuni.ac.ke) / +254 719 574 060